AMENDMENTS TO THE CLAIMS

1. (Previously Presented) A scanning optical system for emitting at least one beam scanning in a main scanning direction, comprising:

a light source that emits the at least one beam;

a polygonal mirror that rotates and deflects the at least one beam to scan in the main scanning direction; and

an imaging optical system that converges the at least one beam deflected by said polygonal mirror to form at least one beam spot on a surface to be scanned, the at least one beam spot scanning in the main scanning direction on the surface to be scanned,

wherein the at least one beam incident on said polygonal mirror is inclined in an auxiliary scanning direction which is perpendicular to the main scanning direction,

wherein at least one lens surface of said imaging optical system is configured such that a beam reflected therefrom is not incident on reflective surfaces of said polygonal mirror,

wherein said imaging optical system includes a lens having said at least one lens surface, said lens being positioned such that an optical axis of said lens is perpendicular to a rotational axis of said polygonal mirror.

2. (Cancelled)

3. (Previously Presented) The scanning optical system according to claim 1, wherein a position at which the at least one beam emitted by said light source impinges on said polygonal mirror substantially coincides with an intersection of said polygonal mirror and the optical axis of said lens.

4. (Original) The scanning optical system according to claim 3, wherein the intersection substantially coincides with a center position of a reflective surface of said polygonal mirror in a direction of the rotational axis of said polygonal mirror.

5. (Previously Presented) The scanning optical system according to claim 1, wherein said lens is made of plastic.

6. (Previously Presented) The scanning optical system according to claim 1, wherein said at least one lens surface is symmetrical with respect to the optical axis of said lens in the auxiliary scanning direction.

7. (Previously Presented) A scanning optical system for emitting at least one beam scanning in a main scanning direction, comprising:

a light source that emits the at least one beam;

a polygonal mirror that rotates and deflects the at least one beam to scan in the main scanning direction; and

an imaging optical system that converges the at least one beam deflected by said polygonal mirror to form at least one beam spot on a surface to be scanned, the at least one beam spot scanning in the main scanning direction on the surface to be scanned,

wherein the at least one beam incident on said polygonal mirror is inclined in an auxiliary scanning direction which is perpendicular to the main scanning direction,

wherein at least one lens surface of said imaging optical system is configured such that a beam reflected therefrom is not incident on reflective surfaces of said polygonal mirror,

wherein said imaging optical system includes a lens having said at least one lens surface, said lens facing said polygonal mirror,

wherein said lens and said polygonal mirror are configured so as to satisfy a condition:

$$H/2 < |2\beta D(D-R_{Z1})/R_{Z1}| \quad \ldots. (1)$$

where H represents a thickness of said polygonal mirror in the auxiliary scanning direction, $\beta$ represents an incident angle of the at least one beam with respect to a reflective surface of said polygonal mirror in the auxiliary scanning direction, D represents a distance between the reflective surface of said polygonal mirror and said lens, and $R_{Z1}$ represents a radius of curvature of said at least one lens surface of said lens in the auxiliary scanning direction.

8. (Cancelled)

9. (Previously Presented) A scanning optical system for emitting at least one beam scanning in a main scanning direction, comprising:

a light source that emits the at least one beam;

a polygonal mirror that rotates and deflects the at least one beam to scan in the main scanning direction; and

an imaging optical system that converges the at least one beam deflected by said polygonal mirror to form at least one beam spot on a surface to be scanned, the at least one beam spot scanning in the main scanning direction on the surface to be scanned,

wherein the at least one beam incident on said polygonal mirror is inclined in an auxiliary scanning direction which is perpendicular to the main scanning direction,

wherein at least one lens surface of said imaging optical system is configured such that a beam reflected therefrom is not incident on reflective surfaces of said polygonal mirror,

wherein said imaging optical system includes a lens having said at least one lens surface,

wherein an other surface of said lens is configured such that a beam reflected therefrom proceeds toward an outside region of said polygonal mirror,

wherein said lens faces said polygonal mirror,

wherein said lens and said polygonal mirror are configured so as to satisfy a condition:

$$H/2 < |\beta D(D-L_Z)/L_Z|$$

$$L_Z = R_{Z1}R_{Z2}D/(2NR_{Z1}D-2(N-1)R_{Z2}D-R_{Z1}R_{Z2}) \quad \ldots . (2)$$

where H represents a thickness of said polygonal mirror in the auxiliary scanning direction, $\beta$ represents an incident angle of the at least one beam with respect to a reflective surface of said polygonal mirror in the auxiliary scanning direction, D represents a distance between the reflective surface of said polygonal mirror and said lens, $R_{Z1}$ represents a radius of curvature of said at least one lens surface of said lens in the auxiliary scanning direction, $R_{Z2}$ represents a radius of curvature of the other lens surface of said lens in the auxiliary scanning direction, and N represents a refractive index of said lens at a design wavelength.

10. (Original)The scanning optical system according to claim 1, wherein said beam reflected by said at least one lens surface proceeds above a top surface of said polygonal mirror.

11. (Original) The scanning optical system according to claim 1, wherein said beam reflected by said at least one lens surface proceeds below a bottom surface of said polygonal mirror.

12. (Original) The scanning optical system according to claim 1,

wherein said imaging optical system has:

a scanning lens; and

a compensation lens provided on the surface to be scanned side with respect to said scanning lens, said compensation lens compensating for curvature of field,

wherein said scanning lens has said at least one lens surface,

wherein at least one surface of said scanning lens is formed to be an anamorphic aspherical surface,

wherein at least one surface of said compensation lens is formed to be an aspherical surface defined by a two-dimensional polynomial expression.

13. (Original) The scanning optical system according to claim 12, wherein said at least one lens surface of said scanning lens is symmetrical with respect to an optical axis of said scanning lens in the auxiliary scanning direction.

14. (Original) The scanning optical system according to claim 12,

wherein one surface of said scanning lens is formed to be an anamorphic aspherical surface, and an other surface of said scanning lens is formed to be a toric surface.

15. (Original) The scanning optical system according to claim 1,

wherein said at least one beam includes a plurality of beams,

wherein said polygonal mirror deflects the plurality of beams to scan in the main

scanning direction,

wherein said imaging optical system converges the plurality of beams deflected by said polygonal mirror to form a plurality of beam spots on respective surfaces to be scanned, the plurality of beam spots scanning in the main scanning direction on the respective surfaces to be scanned,

wherein the plurality of beams incident on said polygonal mirror are inclined in the auxiliary scanning direction.

16. (Original) The scanning optical system according to claim 15,

wherein said imaging optical system has:

a scanning lens; and

a plurality of compensation lenses provided on the surfaces to be scanned side with respect to said scanning lens, each of said compensation lenses compensating for curvature of field,

wherein the plurality of beams deflected by said polygonal mirror pass through said scanning lens,

wherein the plurality of beams emerged from said scanning lens pass through the plurality of said compensation lenses, respectively.

17. (Original) The scanning optical system according to claim 16, wherein optical paths of the plurality of beams between said polygonal mirror and said scanning lens are

symmetrical with respect to an optical axis of said scanning lens.

18. (Previously Presented) The scanning optical system according to claim 7, wherein said lens is made of plastic.

19. (Previously Presented) The scanning optical system according to claim 7, wherein said at least one lens surface is symmetrical with respect to an optical axis of said lens in the auxiliary scanning direction.

20. (Previously Presented) The scanning optical system according to claim 7, wherein said beam reflected by said at least one lens surface proceeds above a top surface of said polygonal mirror.

21. (Previously Presented) The scanning optical system according to claim 9, wherein said lens is made of plastic.

22. (Previously Presented) The scanning optical system according to claim 9, wherein said at least one lens surface is symmetrical with respect to an optical axis of said lens in the auxiliary scanning direction.

23. (Previously Presented) The scanning optical system according to claim 9,

wherein said beam reflected by said at least one lens surface proceeds above a top surface of said polygonal mirror.

24. (New) The scanning optical system according to claim 1,

wherein said lens faces said polygonal mirror,

wherein said lens and said polygonal mirror are configured so as to satisfy a condition:

$$H/2 < |2\beta D(D-R_{Z1})/R_{Z1}| \qquad \ldots\ldots(1)$$

where H represents a thickness of said polygonal mirror in the auxiliary scanning direction, β represents an incident angle of the at least one beam with respect to a reflective surface of said polygonal mirror in the auxiliary scanning direction, D represents a distance between the reflective surface of said polygonal mirror and said lens, and $R_{Z1}$ represents a radius of curvature of said at least one lens surface of said lens in the auxiliary scanning direction.

25. (New) The scanning optical system according to claim 1,

wherein an other surface of said lens is configured such that a beam reflected therefrom proceeds toward an outside region of said polygonal mirror.

26. (New) The scanning optical system according to claim 25,

wherein said lens faces said polygonal mirror,

wherein said lens and said polygonal mirror are configured so as to satisfy a condition:

$$H/2 < |\beta D(D-L_Z)/L_Z|$$

$$L_Z = R_{Z1}R_{Z2}D/(2NR_{Z1}D-2(N-1)R_{Z2}D-R_{Z1}R_{Z2}) \quad \ldots\ldots (2)$$

where H represents a thickness of said polygonal mirror in the auxiliary scanning direction, $\beta$ represents an incident angle of the at least one beam with respect to a reflective surface of said polygonal mirror in the auxiliary scanning direction, D represents a distance between the reflective surface of said polygonal mirror and said lens, $R_{Z1}$ represents a radius of curvature of said at least one lens surface of said lens in the auxiliary scanning direction, $R_{Z2}$ represents a radius of curvature of the other lens surface of said lens in the auxiliary scanning direction, and N represents a refractive index of said lens at a design wavelength.

27. (New) The scanning optical system according to claim 7, wherein said beam reflected by said at least one lens surface proceeds below a bottom surface of said polygonal mirror.

28. (New) The scanning optical system according to claim 7,

wherein said imaging optical system has:

a scanning lens; and

a compensation lens provided on the surface to be scanned side with respect to said scanning lens, said compensation lens compensating for curvature of field,

wherein said scanning lens has said at least one lens surface,

wherein at least one surface of said scanning lens is formed to be an anamorphic aspherical surface,

wherein at least one surface of said compensation lens is formed to be an aspherical surface defined by a two-dimensional polynomial expression.

29. (New) The scanning optical system according to claim 28, wherein said at least one lens surface of said scanning lens is symmetrical with respect to an optical axis of said scanning lens in the auxiliary scanning direction.

30. (New) The scanning optical system according to claim 28,

wherein one surface of said scanning lens is formed to be an anamorphic aspherical surface, and an other surface of said scanning lens is formed to be a toric surface.

31. (New) The scanning optical system according to claim 7,

wherein said at least one beam includes a plurality of beams,

wherein said polygonal mirror deflects the plurality of beams to scan in the main scanning direction,

wherein said imaging optical system converges the plurality of beams deflected by said polygonal mirror to form a plurality of beam spots on respective surfaces to be scanned, the plurality of beam spots scanning in the main scanning direction on the respective surfaces to be scanned,

wherein the plurality of beams incident on said polygonal mirror are inclined in the auxiliary scanning direction.

32. (New) The scanning optical system according to claim 31,

wherein said imaging optical system has:

a scanning lens; and

a plurality of compensation lenses provided on the surfaces to be scanned side with respect to said scanning lens, each of said compensation lenses compensating for curvature of field,

wherein the plurality of beams deflected by said polygonal mirror pass through said scanning lens,

wherein the plurality of beams emerged from said scanning lens pass through the plurality of said compensation lenses, respectively.

33. (New) The scanning optical system according to claim 32, wherein optical paths of the plurality of beams between said polygonal mirror and said scanning lens are symmetrical with respect to an optical axis of said scanning lens.

34. (New) The scanning optical system according to claim 9, wherein said beam reflected by said at least one lens surface proceeds below a bottom surface of said polygonal mirror.

35. (New) The scanning optical system according to claim 9,

wherein said imaging optical system has:

a scanning lens; and

a compensation lens provided on the surface to be scanned side with respect to said scanning lens, said compensation lens compensating for curvature of field,

wherein said scanning lens has said at least one lens surface,

wherein at least one surface of said scanning lens is formed to be an anamorphic aspherical surface,

wherein at least one surface of said compensation lens is formed to be an aspherical surface defined by a two-dimensional polynomial expression.

36. (New) The scanning optical system according to claim 35, wherein said at least one lens surface of said scanning lens is symmetrical with respect to an optical axis of said scanning lens in the auxiliary scanning direction.

37. (New) The scanning optical system according to claim 35,

wherein one surface of said scanning lens is formed to be an anamorphic

aspherical surface, and an other surface of said scanning lens is formed to be a toric surface.

38. (New) The scanning optical system according to claim 9,

wherein said at least one beam includes a plurality of beams,

wherein said polygonal mirror deflects the plurality of beams to scan in the main scanning direction,

wherein said imaging optical system converges the plurality of beams deflected by said polygonal mirror to form a plurality of beam spots on respective surfaces to be scanned, the plurality of beam spots scanning in the main scanning direction on the respective surfaces to be scanned,

wherein the plurality of beams incident on said polygonal mirror are inclined in the auxiliary scanning direction.

39. (New) The scanning optical system according to claim 38,

wherein said imaging optical system has:

a scanning lens; and

a plurality of compensation lenses provided on the surfaces to be scanned side with respect to said scanning lens, each of said compensation lenses compensating for curvature of field,

wherein the plurality of beams deflected by said polygonal mirror pass through

said scanning lens,

wherein the plurality of beams emerged from said scanning lens pass through the plurality of said compensation lenses, respectively.

40. (New) The scanning optical system according to claim 39, wherein optical paths of the plurality of beams between said polygonal mirror and said scanning lens are symmetrical with respect to an optical axis of said scanning lens.